

### **REMARKS**

Claims 1, 3-7, 10-15, 17-23, 25, and 28-34 were previously pending in this application. Claims 1, 20, 25, and 34 have been amended. Claims 21-23 have been cancelled. As a result, claims 1, 3-7, 10-15, 17-20, 25, and 28-34 are pending for examination with claims 1, 20, and 25 being independent claims. Amendments to the claims can be found throughout the specification, for example, at page 9, lines 11-18. No new matter has been added.

#### **Rejections Under 35 U.S.C. § 112**

Claims 21-23 are rejected under 35 U.S.C. § 112, second paragraph. Applicant disagrees that claims 21-23 are indefinite. Nonetheless, to facilitate prosecution, Applicant has cancelled claims 21-23 without acceding to the validity or substance of the rejection.

Claim 34 is rejected under 35 U.S.C. § 112, second paragraph. Applicant has amended claim 34 to remove the phrase “such as” and replace it with “selected from the group consisting of.”

Accordingly, withdrawal of rejections of claims 21-23 and 34 under 35 U.S.C. § 112, second paragraph is respectfully requested.

#### **Rejections Under 35 U.S.C. §103**

Claims 1, 3-7, 10, 17-18, 20-23, 25, and 28-34 are rejected under 35 U.S.C. §103(a) as being unpatentable by the teaching of U.S. Patent No. 3,505,215 (hereinafter “Bray”) in view U.S. Patent No. 5, 501,798 (hereinafter “Al-Samadi”).

Applicant disagrees that independent claim 1, 20, and 25, as amended, would have been obvious to one of ordinary skill in the art over the teaching of Bray in view of Al-Samadi. No *prima facie* case of obviousness has been established because one skilled in the art would not have been motivated to combine the teaching of Bray with the teaching of Al-Samadi.

The teaching of Bray discloses a method of purifying water using a desalination unit containing a spiral wound reverse osmosis membrane module. (Bray at col. 3, lines 18-25.) Water is first passed through a coarse screen and then through a first filter before entering the reverse osmosis module. The concentrated solution produced by the reverse osmosis module then passes through a second filter before being discharged from the system. (Bray at col. 3, lines 18-25.) Each of the filters located upstream and downstream of the reverse osmosis module

is a conventional cartridge type filter. (Bray at col. 4, lines 26-27.) In filtration mode, feed water passes through cartridge filter 18 and then through the reverse osmosis module 24. The reverse osmosis module 25 then processes the water to produce product water and a concentrate. The product water is removed from the system at output 26, while the concentrate is filtered through a second cartridge filter 18a and is ultimately removed from the system as brine at outlet 22. (Bray at col. 3, lines 32-36.) Periodically, a timer will activate a valve 16 to connect the water input to the second filter 18a, allowing flow in the opposite direction to accomplish backwashing of the reverse osmosis module. (Bray at col. 3, lines 36-44.) In backwashing mode, input water 10 will flow through second cartridge filter 18a, then through reverse osmosis module 24, filter 18, valve 16, and finally out through output 22. (Bray at col. 3, lines 36-42.) It is important to note that the filtered concentrate of the second cartridge filter 18a cannot be used to backwash the reverse osmosis module or the first cartridge filter because it is removed from the system through output 22.

The teaching of Al-Samadi discloses a filtration system that does not utilize backwashing. The filtration system uses techniques, such as controlling the rate of removal of retentate to control precipitation, and use of precipitating agents, antiscalants and solubilizing agents to prevent fouling and scaling of the filtration units. (Al-Samadi at col. 4, lines 38-41 and col. 5, lines 26-30.)

The teaching of Bray emphasizes the technique of backwashing of the filtration system to clean the filters that have collected debris during filtration mode. (Bray at col. 1, lines 24 to 27.) In contrast, the teaching of Al-Samadi does not disclose any backwashing of the filtration system, but instead uses other techniques including adding precipitating and solubilizing agents to the system.

One of ordinary skill in the art using backwashing techniques to clean or unclog filters and increase the life of the membrane would not have looked to a teaching that uses precipitating agents, antiscalants and solubilizing agents to prevent fouling and scaling of the filters. Therefore, there is no motivation to combine the teaching of Al-Samadi with the teaching of Bray, and one of ordinary skill in the art would not have made the proposed combination in the manner suggested by the Examiner. Even if the references could have been combined, any resultant combination would lack each and every element of the claimed invention. The combination of Bray and Al-Samadi would have produced a filtration system that uses

techniques such as controlling the rate of removal of retentate to control precipitation, and use of precipitating agents, antiscalants and solubilizing agent to prevent fouling and scaling of the filtration units to increase the efficiency of the system.

Thus, independent claims 1, 20, and 25 are patentable over the teaching of Bray in view of the teaching of Al-Samadi because the *prima facie* case of obviousness is improper. For at least the same reasons, dependent claims 3-7, 10, and 17-18, and 28-34 which depend directly or indirectly from independent claims 1 and 25 are patentable.

Claims 21-23 have been cancelled, and, accordingly, the rejection of these claims is now moot.

Accordingly, reconsideration and withdrawal of the rejection of claims 1, 3-7, 10, 17-18, 20-23, 25, and 28-34 under 35 U.S.C. § 103(a) is respectfully requested.

Claims 1, 3-7, 10, 17-18, 20, 25, and 28-34 are rejected under 35 U.S.C. § 103(a) as being unpatentable by the teaching of U.S. Patent No. 6,120,688 (hereinafter “Daly”) in view of Al-Samadi.

Applicant disagrees that independent claim 1, 20, and 25, as amended, would have been obvious to one of ordinary skill in the art over the teaching of Daly in view of Al-Samadi. No *prima facie* case of obviousness has been established because one skilled in the art would not have been motivated to combine the teaching of Daly with the teaching of Al-Samadi.

The teaching of Daly discloses a method of purifying impure water using an apparatus, comprising the steps of providing a microfiltration unit, at least one reverse osmosis unit and a clean-in-place (CIP) tank containing concentrated retentate. The concentrated retentate is filtered through a ten micron filter and is then used to backwash the microfiltration unit. (Daly at col. 2, line 55 – col. 3, line 21; and col. 6, lines 45-67.)

The teaching of Daly emphasizes the technique of backwashing the microfiltration unit. In contrast, the teaching of Al-Samadi does not disclose any backwashing of the filtration system, but instead uses other techniques discussed above.

One of ordinary skill in the art using backwashing techniques to clean or unclog a microfiltration unit and increase the life of the membrane would not have looked to a teaching that uses precipitating agents, antiscalants and solubilizing agents to prevent fouling and scaling of the filters. Therefore, there is no motivation to combine the teaching of Al-Samadi with the

teaching of Daly, and one of ordinary skill in the art would not have made the proposed combination in the manner suggested by the Examiner. Even if the references could have been combined, any resultant combination would lack each and every element of the claimed invention.

The ten micron filter taught in Daly is not the same as the microfiltration and ultrafiltration membranes as presently claimed. As previously presented in the Declaration of Joseph Edward Zuback under 37 CFR § 1.132 (hereinafter "Declaration") filed on June 26, 2008, the purpose of the ten micron filter of Daly is to protect the reverse osmosis membrane(s). (Declaration at paragraph no. 4.) Daly does not recognize or even acknowledge that materials may originate, or be formed within the reverse osmosis membrane modules. (Declaration at paragraph no. 5.) Daly also does not recognize that there may be a need to filter out these materials, as a ten micron filter is too coarse to perform this function. (Declaration at paragraph nos. 4-5.) The materials may take the form of flocculants or particles created by certain dissolved solids that are concentrated in the retentate and that will exceed their solubility causing precipitates to form. In addition or in the alternative, these materials may be bacterial colonies that grow and eventually detach from the membrane and enter the retentate stream. (Declaration at paragraph no. 7; and Application at page 2, lines 7-20.) Thus, the ten micron filter of Daly is not equivalent and cannot operate as the secondary microfiltration or ultrafiltration membrane filter as presently claimed. That is, Daly does not disclose the secondary microfiltration or ultrafiltration unit used to produce a filtered saline solution. Therefore, Daly does not disclose each and every element of independent claims 1, 20, and 25.

Al-Samadi does not cure the deficiencies of Daly. As noted above, Al-Samadi does not contemplate the use of backwashing and instead uses techniques such as controlling the rate of removal of retentate to control precipitation, and use of various agents to prevent fouling and scaling of the filtration units. The combination of Daly and Al-Samadi would have produced a filtration system that uses techniques other than backwashing to minimize fouling of the reverse osmosis module.

Thus, independent claims 1, 20, and 25 are patentable over the teaching of Daly in view of the teaching of Al-Samadi because the *prima facie* case of obviousness is improper. For at least the same reasons, dependent claims 3-7, 10, and 17-18, and 28-34 which depend directly or indirectly from independent claims 1 and 25 are patentable.

Claims 21-23 have been cancelled, and, accordingly, the rejection of these claims is now moot.

Accordingly, reconsideration and withdrawal of the rejection of claims 1, 3-7, 10, 17-18, 20-23, 25, and 28-34 under 35 U.S.C. § 103(a) is respectfully requested.

Dependent claims 11-15, 19, and 34 are rejected under 35 U.S.C. § 103(a) as being unpatentable by the teaching of Bray in view of Al-Samadi, as applied to claims 1 and 25, and further in view of the Water Encyclopedia (Jay Lehr, editor, John Wiley & Sons, Inc., New York, 2005) hereinafter "Water Encyclopedia."

Dependent claims 11-15, 19, and 34 are also rejected under 35 U.S.C. § 103(a) as being unpatentable by the teaching of Daly in view of Al-Samadi, as applied to claims 1 and 25, and further in view of Water Encyclopedia.

Applicant disagrees that claims 11-15, 19, and 34 would have been obvious to one of ordinary skill in the art over the teaching of Bray or Daly in view of Al-Samadi, as applied to claim 1. As discussed above, the rejection is improper because no *prima facie* case of obviousness has been established. Further, any *prima facie* case of obviousness is rebutted because the alleged combination would lack at least one recited element.

Water Encyclopedia teaches generally methods and treatments of purifying water. The various chemical, radiation, and physical treatments taught in Encyclopedia are intended to further purify the stream to provide drinkable water. One of ordinary skill in the art looking to use a feed stream or a reverse osmosis retentate to backwash a microfiltration unit as in Bray or Daly, would not have been motivated to then treat the retentate to purify and enhance it, as suggested by the Examiner. Additionally, the deficiencies of Bray or Daly in view of Al-Samadi are not cured by the teaching of Encyclopedia. Encyclopedia does not disclose, teach or suggest a method, as recited in claims 11-15, and 19, or a system as recited in claims 25, and 27-34. Therefore, the combined teachings of Daly or Bray in view of Al-Samadi, and further in view of Encyclopedia would have failed to teach each and every claimed element.

For at least the reasons mentioned above, claims 11-15, 19, and 34 would not have been obvious over the teaching of Daly or Bray in view of Al-Samadi, as applied to claims 1 and 25, and further in view of Water Encyclopedia.

Accordingly, reconsideration and withdrawal of the rejection of these claims under 35 U.S.C. § 103(a) is respectfully requested.

### **CONCLUSION**

In view of the foregoing amendments and remarks, reconsideration is respectfully requested. This application should now be in condition for allowance; a notice to this effect is respectfully requested. If the Examiner believes, after this amendment, that the application is not in condition for allowance, the Examiner is requested to call the Applicant's attorney at the telephone number listed below.

If this response is not considered timely filed and if a request for an extension of time is otherwise absent, Applicant hereby requests any necessary extension of time. If there is a fee occasioned by this response, including an extension fee, that is not covered by an enclosed check, please charge any deficiency to Deposit Account No. 50/2762 (Ref. No. M2019-7022US).

Respectfully submitted,  
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